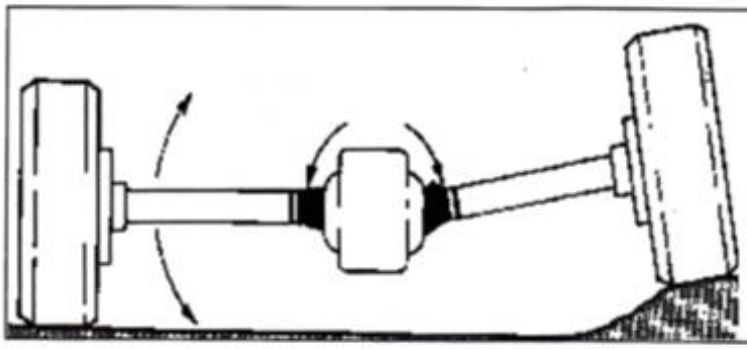
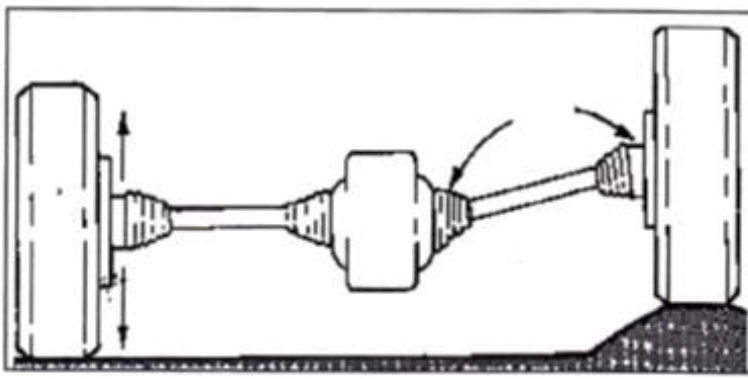
COMPENSATOR

HOW TO KEEP YOUR REAR END PLANTED

Pictured on the left is David Hanson and Fred Logan from Canberra in their Denlo Motors' Beetle competing in the Australian Ampol Trial of 1964. The photo shows them airborne while negotiating a section of the Trial in Victoria. It also shows the characteristic wheel 'tuck' of the early swing-axle suspension, which although designed to give a comfortable and reliable ride at a typical slow 1200cc Beetle pace, the Trial revealed the shortcomings of the swing-axle at pace. A simple solution would have been to add a camber compensator....



Swing axles only pivot from one point at their inner end, thus causing the rear wheels to swing vertically in an arc with the transmission in the centre. Although this provides independent shock absorption, the handling when pushed hard through a corner or over rough surfaces becomes unpredictable and dangerous. Camber changes noticably to positive (wheel tucking under) and body roll, where both wheels lean towards the corner, results in severe oversteer.

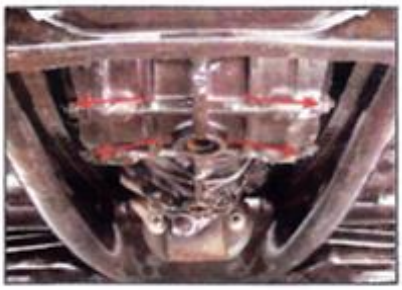


In later models, Volkswagen introduced a double jointed axle or IRS (independent rear suspension). The rear wheels can now maintain negative camber as they no longer swing through an arc due to the incorporation of CV joints on the ends of the axles. In fast, tight corners the negative camber will actually increase under load, thus improving the handling and attitude of the Beetle. Some argue that IRS is not as strong as a swing axle setup, but the handling improvements are chalk and cheese.

Rather than trade your early Beetle in on a later model to gain the advantage of IRS, or indeed perform a pan transplant under your early shaped bug, a more cost effective method is to install a camber compensator. The camber compensator doesn't change the way a swing axle works, but helps to prevent camber changes when a wheel(s) is unloaded. The compensator is a centrally pivoted leaf spring that cradles the axles and holds them in a set position. The one shown here is the preferred choice when aiming to keep some ride comfort as it still allows the suspension to travel upwards. Some compensators are braced to the axle for a stiff ride.

First step is to run your VW up onto car ramps. This will keep the axles horizontal so that the camber compensator can be fitted. Note, car ramps are not the most co-operative workshop tool, choosing to slip at inopportune moments. Take care!

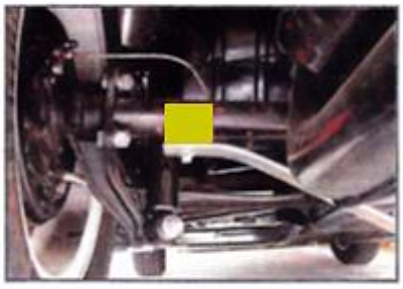
The four 13mm nuts on the bottom of the transmission case are loosened and backed off to the very end of the studs. There's no need to take them completely off as the compensator will slip between the case and the nut and washer. Check for any fluid leaks.



Separate the compensator cradle from the compensator spring and fit the cradle first. This will make it so much easier to align the cradle and torque the transmission nuts to factory specs. The cradle slips between the case and the nut and washer.

The compensator spring is then bolted back onto the cradle, while at the same time ensuring the urethane ends of the compensator spring are neatly under the axles. As the spring is tensioned a little muscle is required to fit the 15mm bolts and nuts back into place.

Position the urethane ends under the axles so that they neatly hold the axle without rubbing on shocks or brake lines. The camber compensator and urethane ends have some adjustment built in, so it is possible to move the compensator for a good fit.



Once the compensator is correctly positioned, tighten the centre swing bolt and nut (15mm), the spring to cradle bolts and nuts (15mm) and the outer urethane nuts (13mm). I also put some grease between the urethane block and axle to prevent any squeaking.